

DOCUMENT RESUME

ED 277 057

CS 505 432

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TITLE A Grounded Theory of Future Talk.
PUB DATE May 86
NOTE 26p.; Paper presented at the Annual Meeting of the International Communication Association (36th, Chicago, IL, May 22-26, 1986). Print style may affect legibility.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Communication (Thought Transfer); *Communication Research; Content Analysis; Decision Making; *Futures (of Society); Information Sources; Policy Formation; *Scientific and Technical Information; *Speech Communication; Speeches

ABSTRACT

A study examined the ways that people talk to policy and decision makers about the future and constructed a model of future talk. Specifically, speeches given to government policy makers about science and technology were analyzed in order to discover how people communicate information about the future. Each incident was reviewed and assigned a descriptive label or categories. The category system was developed from the data to reflect the nature of future talk. Categories included non prescriptive predictions, indirect prescriptions (prediction), prescriptions, contrasting time references, comparisons, personal/common vision, problem identification, synergistic references, emphasis on a macro view, future as an entity, emphasis on rate of change, and miscellaneous. These categories were in turn divided into three groups: causal cluster, temporal cluster, and communication cluster. Three predominant themes emerge as characteristics of how people talk about the future. First, future talk relates past and present events in order to foster better understanding and acceptance of the changes to come. Second, cause and effect relationships provide a fuller context for imagining and understanding possible futures in science and technology. Third, talk about the future tends to deal with competitive issues and comparisons. (A figure illustrating a model of future talk is included.) (SRT)

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A Grounded Theory of Future Talk

**Presented at the Annual Convention
International Communication Association**

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**May 22-25, 1986
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Abstract

This study examines the way people communicate about the future. It describes a set of common characteristics developed from a comparison of speeches given to government policy makers on the subject of science and technology. The theory presented here builds upon existing research, extending it to areas not discussed in current literature. While the planning and forecasting literature explain processes and strategies for thinking about and viewing the future, this study looks at how people actually "do future talk."

The findings suggest that causality, temporal features and communication strategies are three important characteristics of future talk. The descriptive model presented at the conclusion of the paper suggests that people use events in their past and present to better understand inevitable changes in the future. A second finding of this study suggests that future talk in the area of science and technology typically contains highly competitive references. Finally, causal relationships provide the glue for building the structures of future talk.

Future, noun, 1. the time that is to come; days, months, or years ahead.
2. what will happen; what is going to be.

Webster's New World Dictionary

None of us *knows* what will happen tomorrow, next week, or next year, yet all of us must make decisions about the future. We plan for and anticipate the events, trying to envision what will happen, what we will say, how we will act/react. Most of us do this type of "forecasting" naturally, and contemplate the future with much less vigor than policy makers or futurists.

This paper will look some of the ways in which people communicate information about the future. To do this study, I examined speeches made to state policy makers about science and technology issues. I selected this topic because policy makers are finding a growing need to increase their knowledge and reduce their uncertainty about the effects of scientific and technological advancements on their constituents and on the economy (Castells, 1985). Their concerns range from job displacement/unemployment in the workplace, to reducing state expenditures by increasing employee productivity, to diversifying the traditional tax base of their state.

This paper provides a typology of "future talk" characteristics, developed from speeches given to government policy makers from two states.¹ The speakers come from a variety of backgrounds, i.e. former and current public officials, university researchers, and an attorney, and were chosen for their expertise in planning for and managing science and technology issues. The purpose of this study is to examine the ways that people talk to policy and decision makers about the future, and to construct a model of future talk.

Introduction

Why is future thinking and future talk so crucial for policy and decision makers? Dapus (1985) suggests that individuals with a future time perspective will also have the ability to act in the present to bring about a desirable future. This perspective is particularly important for individuals who make decisions and establish policies in the public interest. This paper will focus

¹Florida and Texas were used.

on people who strive to maximize the societal benefits of scientific and technological advances because advances in information technology are intimately tied to our future.

By studying communication about the future, we can better understand the actual behavior exhibited by people engaged in this important activity. We can also gain better insight into the ways in which future talk about technology impacts decisions and policies that affect our lives.

Much of the literature on communicating about the future contains prescriptive techniques and strategies for planning and forecasting (Koehler, 1984; Merryman, 1984; Vetter, 1984). While these writings do not demonstrate the communication features of future talk, they provide the building blocks for the theory generated in this paper.

Some writing has been done on the use of story-telling and scenarios as a creative mechanism communicating about events that have not yet happened. Michael (1985) contends that when we think about the future, we construct images from the present and the past and organize them according to the norms of our culture. Stories about the future generally have a historical base, and are governed by the current images in our society.

A scenario makes rigorously derived projections more vivid by presenting them in story form (Bright, 1978). The difference between storytelling and scenario building lies in the fact that events included in a scenario cannot be pure fabrication; they must have a sound logical basis for development. This study will reinforce the effectiveness of scenario as a communication tool for future talk.

The future itself can be classified into 1) that which is foreseeable and 2) that which is unforeseeable (Taschdjian, 1977). In the foreseeable future, we can obtain information to help reduce uncertainty; however, we have no information about the unforeseeable future. Theoretically, public policy-makers act on the foreseeable future, while trying to minimize any negative impact of events in the unforeseeable future.

In either case, the future is inherently unknowable with any level of accuracy (Toffler, 1985). This paper attempts to uncover how people talk about the "unknowable?" How do they begin to communicate about events that have not yet happened? How do people talk about the future?

Methodology

This study will develop a typology and a model of the way people talk about the future. In order to do this, a system of descriptive categories was developed from transcripts of people talking about the future in science and technology. This section will discuss the theoretical basis for the analysis and describe the data sources.

Constant Comparative Analysis

Using Glaser and Strauss's (1967) constant comparative method, the category system was developed *from the data* reflecting the nature of future talk. Each incident -- a complete thought -- was reviewed and assigned a descriptive label or category. Each successive incident was compared to the previously designated categories to determine applicability of the properties from that category. New categories emerged as data analysis proceeded. (Browning, 1978; Glaser, 1978; Glaser and Strauss, 1967) This constant comparison of data was completed on 355 incidents in five speeches.

The use of comparison to generate theory has support elsewhere in the communication literature. Weick (1981) contends that the only way that talk can be used to draw conclusions is if it is compared against what could have happened, but didn't. By comparing a number of examples of talk, we can draw conclusions about its elemental structure. The components of the model proposed in this study were constructed from comparisons among five sources in three separate settings.

Data Sources

Three of the five speeches were obtained from detailed transcripts of the organizational meeting of the Texas Senate Select Committee on Business, Technology and Education in December, 1983. The speakers were 1) Mayor Henry Cisneros of San Antonio, Texas; 2) the Honorable Ray

Marshall, former Secretary of Labor and Chairman of the (Texas) State Job Training Coordinating Council; and 3) Ms. Shannon Yale, attorney with Bracewell and Patterson law firm, Austin, Texas.

The remaining two speeches came from transcripts of audio cassette recordings. The first was given to a joint meeting of the House Committee on Science and Technology and the Senate Select Committee on Business, Technology and Education, and the Governor's Science and Technology Council from the State of Texas in April, 1985. The speaker, Dr. Frank Press, is the President of the National Academy of Sciences², and professor at Massachusetts Institute of Technology in the Department of Geophysical Sciences.

The second of the audio speeches was given by Dr. George Kozmetsky, Executive Associate for Economic Affairs, University of Texas System, professor of management and computer science at University of Texas (UT) at Austin, and professor in the Department of Medicine, UT Health Science Center at San Antonio. He was speaking to Speaker's Advisory Committee on the Future, Florida House of Representatives in August, 1985.

After careful analysis of these transcripts, the categories or classifications representing the characteristics of future talk were organized into related clusters. A comprehensive model of how people talk about the future was formulated. The specific categories and methods for this process are described in the next section.

Categories

The analysis of the data produced 13 categories characterizing 355 incidences of future talk. To be included in the analysis, the data had to relate to a concept or point that the speaker explained about the future. Speakers' credentials, off-the-cuff remarks, examples, and evaluative statements about the past or present were included if they related to a point about the future. I excluded introductory, procedural, and vague methodological remarks from the analysis.

²The National Academy of Sciences is a private organization of leading scientists whose charter is to advise the federal government on science, technology and national welfare issues.

The analysis did not consider the accuracy, value, or effect of any of the information given in the speeches.

As grounded theory allows, some incidents in the data can be coded into multiple categories; however, the classifications themselves are distinct. Each of the categories describes a particular phenomenon in the way people "do" future talk. The relationships between the categories will be discussed along with the category clustering.

Non-prescriptive predictions (44 incidences, 12%)

This category contains predicted events in the future. All of the statements in this category describe only future events. They do not include suggested actions to accomplish these events, although background and applications of the predicted events are mentioned in a few instances. Time references to the present can be stated or implied.

Non-prescriptive predictions appear to fall into four subcategories: 1) nonevaluative changes from the present, 2) increases or decreases from the present, 3) preservation of the present, and 4) counterbalancing predictions. The first subcategory contains predictions of future events that differ from the present in a unspecified way, e.g. "The greatest competitors will be Germany and Japan." This category also includes introduction of new concepts, e.g. "...the break up of AT&T promises to place new pressures on the state regulatory apparatus."

Second, predictions reflecting increases or decreases from the present describe future events that contain more or less of an existing property, e.g. "...There will be five times more (Department of Defense obligations) in 1986, just for the supercomputer in Florida."

Several predictions focused on preservation of the present, reserving and saving the progress that has been made up to the present time. For example, "...you're going to hold on to the population that you have that really provides the tax base and provides the kind of future and opportunities you want between 35 and 44."

Finally, counterbalancing predictions describe positive impacts that are counteracted by negative impacts, i.e. "...we hear that the Sunbelt... is going to take off and... leave the so-called

Frostbelt of the industrial North far behind. ... Not going to happen." This is commonly known as a strawman argument.

Incidences in this category may be derived from statistical data, e.g. "...data...from the Labor Department...show you that actually very few jobs will be created in the high tech industries themselves." Statistical predictions appear to be used to foster objectivity and bolster credibility.

Indirect prescriptions (prediction) (53 incidences, 15%)

This category includes predictions and the stated or implied conditions needed to bring about the predictions. These needed conditions are indirectly prescribed for the predicted event to take place. The speaker does not overtly prescribe the action, but rather states or implies the consequences of not performing the action.

The two primary forms of indirect prescriptions are 1) prediction and 2) cause and effect. The prediction identifies a future need or condition, and thereby, implies a prescribed action. For example, "...leadership will be based on a nation's science and technology base, the level of education of its work force, the quality of its scientists and engineers, ..." This statement prescribes three target areas for improvement.

The cause and effect, or traditional "If ..., then ..." format offers a prescription as the cause or "if" portion of a statement. The prediction is the consequence or "then" portion of the statement. "If you have a faculty that's creative (and) original, (then) industry will beat a path to the door of that faculty member.

Most of the sources of the prescriptions in this category are implied, e.g. "The more we can do to create an image that we don't have that problem here, the better off, ... we're likely to be." However, one example states a series of needs by a third party, i.e. "...they tell me they want to see an educated work force--skilled workers and dedicated workers. They want easy access to well trained scientists and managers, and engineers." Here the third party explicitly prescribes the needed action.

Finally, the prescribed actions and the predictions in this category can indicate either positive or negative consequences. For example, "If you send the wrong signals, I think it will come back to haunt you," indicates a negative impact; the indirect prescription from this statement is "don't send the wrong signals!"

Prescriptions (65 incidences, 18%)

This category includes direct statements of a required, recommended, and suggested action. Phrases such as "you need...", "we must...", "it takes...", and "you have to..." are characteristic of this category. The statements in this category explicitly answer the question, "What do you (we, they) need to do to prepare for the future?" The difference between we need..., you need..., they need... are not particularly significant except as a possible indicator of the speakers' personal identification with the prescription. However, fluctuation between use of the terms may indicate that the use is not intentional.

The prescriptions are singular, e.g. "We have to learn how to become an exporting nation once again," or compound, e.g. "...you need your schools to have standards, examinations, you need your teachers to be qualified, you need to pay them well..." The prescriptions can also be negative or positive, e.g. "...You should not have regulations within your state university system that unwisely prevent it (university/industry relationships) one way or the other" and "...we need to think about how to do joint state and industrial research park environments, to create those low-density campus like environments that attract technology companies..."

References to the Present (128 incidences, 36%)

This category includes descriptions of the current conditions, issues and circumstances. Some of the statements of the present cite the immediate past to provide a reference point for the statement of the present, e.g. "We lost all of the processing of soy beans in Texas by one of the old, old Texas firms because Tennessee was willing to train the workers to use the new equipment that came from West Germany and paid their way for fifteen weeks in West Germany too." References to the present fall into two general categories: 1) competitive references, and 2)

noncompetitive references. Competitive references to the present relate directly to rewards of competition, e.g. strength, leadership, excellence and being "Number One." They include stated or implied prescriptions for how to compete successfully on the domestic or global levels, e.g. "States are looking at their tax policy and their regulatory policy to see how they can spur innovation, to attract new kinds of companies or these refurbished companies..." and "...if we in the United States are unable to pick the growth industries and the declining industries, let's just take their list. You know...the Japanese have been pretty good at it..."

Noncompetitive incidences do not express a competitive benefit. Many of these statements tout accomplishments, e.g. "...We've improved the university-industry link without compromising the interests of the university as a free and open place of inquiry and shared knowledge." Others lament ills, e.g. "We have too many illiterate people in Texas." Noncompetitive statements could be part of a competitive argument, but are not used in this manner by the speakers.

References to the present may cite facts, e.g. "...the fact that the private sector industry, that your philanthropists are working together with your legislature, with your executive branch to build your universities is a very impressive thing to watch from outside the state." They may also describe specific examples, e.g. "You can visit a production line at General Electric... a washing machine on a computer organized production line--completely computer controlled, that can undersell any washing machine in the world--Korean, Japanese, anywhere with high quality..." These references may also reflect opinions, e.g. "i think it's still the case and it will be for a long time that the basic resources that come from the land are essential."

Incidences in this category also possess varying degrees of specificity. For example, "We are the world's strongest technological and scientific nation..." is a very broad statement, while "There seems to be growing recognition in this state that your economy has to change away from the oil-based economy and agriculture..." expresses a more specific idea. As illustrated in this last example, references to the present often coincide with direct or indirect prescriptions; however, by themselves, they provide only information.

Contrasting time references (47 incidences, 13%)

Incidences in this category draw specific relationships between processes or events from two or more different points in time. They include references from the past to the present, from the past to the future, from the present to the future, and sometimes from past and present to the future. The order of the reference was not coded as important.

Some of the incidences in this category overlap with categories previously discussed, e.g. References to the Present ; however, contrasting time references possess two unique characteristics. While time references are often used to bolster support for a prescription, they are non-prescriptive, e.g. "One of the things that has created inflexibility in our economy in the past is narrowed specialization. Education itself leads to flexibility, makes it possible for people to adapt to change, and to change circumstances at any given time as well as through time."

Contrasts of time references also contain expressions of a past or future, beyond the immediate past or immediate future, e.g. "...many of these (large scale productions) started at the turn of the century, and unfortunately, many ... have continued with those technologies."

Two particularly interesting incidences in this category involve "foresight/hindsight." An example of this is "We'll look back on this period and say it was in those years and those shocks and those problems that forced us into re-thinking some of our assumptions..." Here the speaker talks of the past from an unspecified time reference in the future.

Most of the references in this category contrast two specific points in time; however, some include contrasts of "old" and "new," e.g. "...the notion of the faculty entrepreneur is not new--its rather an old notion..." Some incidences include explanations of the transitions between the referents, and others leave it up to the listener to make the connection.

Comparisons (23 incidences, 6%)

Incidences in this category explicitly identify the competing parties, actions, or ideas in a statement of comparison. They prescribe action only by their reference to the competing interests, e.g. "...the faculty of the University of California received a 15% increase this year..."

Comparisons imply 1) domination, 2) subordination, or 3) counterbalance. Dominating and subordinating comparisons involve a one-upmanship result, e.g. "...if you look at our competition, particularly in countries like Japan where every high school graduate has six years of math and science and six years of English, ...and where over 95% of all the eligible population now graduates from high school, and when they get out of high school they've had four more years of actual classroom time than the typical person in the United States." Counter-balancing comparisons involve a neutral effect, e.g. "...Silicon (Valley) has had a long time to develop. So we can't see ourselves as being inherently slow or backwards here. We just haven't had as much time to focus on this industry."

Comparisons also are not bound to time references, i.e. the statements can refer to past, present or future. They are also non-evaluative. While they may describe situations with seemingly positive or negative attributes, they do not explicitly ascribe these attributes to the conditions or issues in the comparison. The example, "...you have something like \$92 million of R&D in your universities in 1983. California had \$867 million. Would you like to compare yourself to Texas? \$235 million," implicitly communicates a dismal situation for Florida, but the speaker leaves this conclusion for the listener.

Personal:Common Vision (22 incidences, 6%)

Incidences in this category communicate present beliefs as they relate to future predictions. Common characteristics of personal vision include causality, ownership, and conviction. Visions reflect personal or shared images of the future, and are only prescriptive if you choose to adopt them as your own.

This category contains two subcategories: scenarios and personal labels. Scenarios require logical ordering of two or more natural or predicted events. For example, "...a lot of good ideas gather steam then slowly, over a period of months, the key people either lose heart, disband, or go back to their previous employers, or just ...continue to plug away in an extremely low level of activity ... and their good product ideas are eventually picked up by some other company from

Boston or San Francisco." Scenarios are not only an effective method of explaining and talking about the future, but they are considered a bonafide forecasting technique (Bright, 1978).

The second subcategory references to personal labels that have been developed for describing their view of the future. For example, "...I've decided to call collaborative. If you don't like that, in my formal writing I call it 'technology venturing.'" Personal methodology and points of view are reflected in this group of incidences.

Incidences in this category can be carefully thought out policy statements, e.g. "I have in mind shared research. I have in mind graduates who move very rapidly from the university research environment into the industrial environment..." Alternatively, they can be random flashes of insight that are based on facts, opinions, or intuition, e.g. "It makes no sense to let an entrepreneur who is scientifically and engineering qualified be kicked out at the end of five years or six years when you prove he is a lousy manager and you can't stand him anymore. It isn't good for him. ...for the community. ...for families."

Problem Identification (25 incidences, 7%)

This category contains the descriptions of the deficiencies that currently exist and the potential difficulties that could accompany some of the prescriptions and the predictions for the future. Although some references to problems state causes and prescriptions, e.g. "We also have to keep our universities open--that because of commercial pressure, graduate students and faculty members don't talk to each other for fear of revealing a commercially useful piece of information..." However, this category does not require statement of causes or prescriptions/solutions.

Incidences of problem identification can be specific statements, e.g. "...in Texas we worry about...half the population of Mexico is reaching the age of fifteen and it will be 120 million or about 20 to 30 million young Mexicans looking for work." They can also take the form of a qualification, "The federal government... is a good patron for research, but you can't rely on the federal government entirely."

This category provides "attention getters" because decision makers often think of themselves as problem solvers. If you state a problem and a future-oriented solution, your suggestions might be received more favorably than if you merely present a series of prescriptions.

Synergistic References (22 incidences, 6%)

This classification describes references to cooperation, coordination, collaboration, and combinations of resources, events, and efforts. The greater effect of the interaction is greater than could result from any individual occurrence. These synergistic effects can refer to the past, present or future.

An example from the past commonly involves learning or success, e.g. "...we learned that the great university systems of the state can work together..." Synergistic references of the present generally refer to beginnings and things that are newly established, e.g. "...we are now talking about networking between Chicago, California and Texas and Florida." Incidences of synergism for the future may emphasize equality, e.g. "...the kind of strength that Austin has developed in micro-electronics and physics, for example, might allow another part of the state, another institution in the system to be particularly strong..."

Emphasis on a Macro-View (9 incidences, 3%)

The incidences in this category force you to step back to look at the "big picture." While the number of references to this type of thinking were not great, the gamut of issues presented in these instances implicitly shows the importance of this category. What do the prescriptions and the predictions of future events the really mean? What are their implications? This type of information is difficult to obtain, and is most assuredly highly subjective, yet it is invaluable, almost essential for people making decisions and formulating policies about the future.

This category contains specific references to magnitude, e.g. "...for this country, for the world for that matter." It also contains expressions of long term, big picture conceptual benefits

of prescriptions, for example, "When you think in terms of the potential economic returns to this state, of the modest investment in your educational plan, they're high, they're expensive, but in the scheme of things they're modest."

Future as an Entity (21 references, 6%)

This category consists of references to the future as an entity or spatial situation. This distinction can be very subtle, so for that reason I used **references**, rather than full blown "incidences" to illustrate this category.

Statements describing the future as an entity attribute characteristics, as though it had an actual physical presence. For example, "key to our future" implies something that is closed or locked. The adjective "new" is widely used to denote a future "thing," e.g. new knowledge, new concepts, new discoveries, new funding, new role. The future is referred to as generally as "It will be dominated by...", or as specifically as, "a new industrial revolution." The most vivid example of the future as an entity is "I think the fact that you can show that all sectors of the state recognize the future, where it lies, and are working together, independent of politics to reach that future is a very important incentive."

Emphasis on Rate of Change (14 incidences, 4%)

Like the previous category, emphasis on rate of change cites **references** rather than totally complete ideas. This category captures references to the fast rate at which the predictions and prescriptions for the future can and do occur. The key phrases in this category refer to the acceleration and compression of time.

The typical form of these references includes terms such as "fast growth," "rapid change" and "mind-boggling rate(s)." These references are used to add emphasis or a sense of urgency to a prescription, particularly when dealing with competitive issues.

Miscellaneous (12 incidences, 3%)

This classification contains a hodge podge of items including references to "more for less," e.g. "... (plants) requiring less fertilizer, less water, that are more resistant to stress," statements of incredulity, e.g. "I can't see how you can under-invest (in education) or make this kind of mistake," and incomplete or truncated thoughts about the future, e.g. "...it points out that if we're going to use technology as a resource or as a base for the needs in the future of this state...?" None of these categories was sufficiently represented in all of the speeches to warrant separate explanation.

Clustering

The classification system contains distinct categories characterizing the nature of future talk, yet several interrelationships exist between the categories. These connections are represented through clusters of related categories. The analysis produced three major category groupings, the causal cluster, the temporal cluster, and the communication cluster.

Causal Cluster

Sociologists examine the causes of past and continuous everyday events to better predict and understand the future (Erikson, 1971). The causal cluster emphasizes the importance of cause and effect relationships, particularly as they relate to predicted future effects. The hierarchy of *Prescription, Indirect Prescription, and Prediction* represents the substance of this cluster. When taken as a whole, this triad contains 1) what should be done (prescription), 2) why it needs to be done (indirect prescription with causality), and 3) what will probably happen as a result (prediction). While causality is not a common element to each of these categories, this "hierarchical" relationship is the cornerstone for the causal characteristics of future talk. This relationship will be called the Prescription/ Prediction Triad.

Statements involving causal relationships can be organized to formulate logical orderings of prescribed events, known as scenarios. The category of *Personal and Common Vision*

contains incidences (scenarios) reflecting these logical relationships. While scenarios are generally non-prescriptive, the element of causality establishes a strong interrelationship between the prescription/prediction triad and the scenario sub-grouping.

Problem Identification incidences can possess both causal and prescriptive characteristics because problems usually have causes and potential solutions. Following traditional problem solving principles, proposed solutions or prescriptions should affect or eliminate the cause(s) rather than the symptoms of the problem(s).

Temporal Cluster

The primary category in the temporal cluster, *Contrasting Time References*, directly illustrates time perspective. The incidences in this category overlap with several other categories because of their broad scope; however, this category contains explicit references to relationships between time frames and events: past, present, and future. Markley (1983) identifies a sense of history (past), a grasp of societal trends (present), and a willingness to forecast (future) as three of the characteristics that futurists possess. Our favorable or unfavorable orientations toward the three time dimensions affects the way we plan for the future (Wood and Christakis, 1984).

Whether competitive or non-competitive, incidences exemplifying *References to Present* relate to the temporal cluster because of their present time orientation, and because several examples in this category contain references to immediate past and future events. To generate prediction, one must interpret and relate observations to existing knowledge (Evans, 1982). Talking about the future in terms of the present appears to be a common phenomenon.

The prescription/prediction triad (*Prescription, Indirect Prescription, and Prediction*) also contains temporal characteristics. The *Indirect Prescription* and *Prediction* categories contain time references imply a need for change. Likewise, *Prescription* is totally based on a change from the past or the present.

Not only is the need for change an important feature of the temporal cluster, but the *Emphasis on Rate of Change* is also a factor. This category the dimension of time compression--the perceptual speed at which the future comes into the present-- to the cluster.

The *Emphasis on Macro-View* category relates to the big picture, stressing the long term benefits of prescriptions and predicted events. It emphasizes the greater good that can be achieved in the future through prudent judgment and action in the present.

Communication Cluster

The topic of this paper is "future talk," so this cluster follows easily from the analysis and the classification system. Many of the points brought out in the causal and the temporal clusters can facilitate the communication process; in fact, cause-effect patterns and temporal patterns are bona fide techniques for organizing speech materials. A third method involves a problem-solution pattern (Devito, 1985). The general principles of these organization techniques will be highlighted in conjunction with specific categories.

Incidences in the *Indirect Prescriptions* category resemble what Simon would consider factual or value premises. The construction of these decision premises allows the audience to complete the enthymeme, drawing the conclusion (prescription) on their own (Tompkins, 1984). This deductive form of reasoning has been known and used since Aristotle.

Comparisons, while not inherently prescriptive, can be used very effectively to motivate people to make a decision or adopted a prescribed action to shape the future, i.e. a comparison with something better implies the need to change and strive for that "better" condition.

Contrasting Time References demonstrate a sound communication strategy: relating the past or the present (that which is known) to the future. This technique helps an audience, whether one person or one hundred, to envision and understand the origins and development of a specific future as it is being communicated. The impetus for change from the present or the past increases when a situation becomes competitive, i.e. *References to the Present*.

Emphasis on Rate of Change can act as a persuasive device. The reference to fast paced changes adds a sense of urgency for the prescribed action to be implemented. Massey (1985) says "When questions of the future...are addressed, discussion usually takes form of prediction of the future rate and nature of technological change" (p. 302). This is a particularly salient communication strategy in competitive situations.

Synergistic References are also an effective persuasive device, particularly in competitive situations where communication and cooperation can be difficult. Reinforcing a cooperative, collaborative increases the audience's openness toward suggestions for change. Many of the problems identified are too large of single remedies to be successful and must be solved through cooperation and combined efforts of competing parties.

Personal and Common Visions can be used as rhetorical devices. Personal vision works to enhance credibility because it implies that the "owner" has thought about and weighed alternatives. When a vision is accepted by others, it becomes a common vision. This enhances the credibility of the group and motivates its members toward attainment of the vision. Scenarios provide a logical, practical, and easy-to-understand structure for talking about a series of possible future events. Scenarios and other creative approaches can increase effectiveness and understanding (Lipinski, 1978). Incidences from this category may or may not reflect a *Macro-View*, but such a view would further enhance the speaker's credibility.

The *Problem Identification* category provides an attention getting device for decision makers, who often see themselves as problem solvers. If you identify a problem and propose solutions, you are likely be received more favorably than if you merely present a series of predictions. Unless there is a problem, little attention is paid to plans and forecasts (Lipinski, 1978). The need for change provides strong underlying support for prescriptions to solve problems.

Finally, *Future as an Entity* provides an important communication insight. This category contains references that describe a way to "view" talk about the future, rather than an actual way to "do" it. It tells us that when people talk about the future they often attribute

substantive characteristics to their causal or temporal referents. For this reason, this category acts as the umbrella concept under which future talk develops.

A Model of Future Talk

The model shown in Figure A depicts the interrelationships between the categories identified in the clusters. The categories *Macro-View*, *Synergistic References* and *Future as an Entity* provide the "overall environment" for the other interactions. The distinctive characteristics of these categories, i.e. the big picture, cooperative philosophy, and overarching view, can coincide with any of the other expressions of future talk. These three categories connote broad implications for communicating about the future.

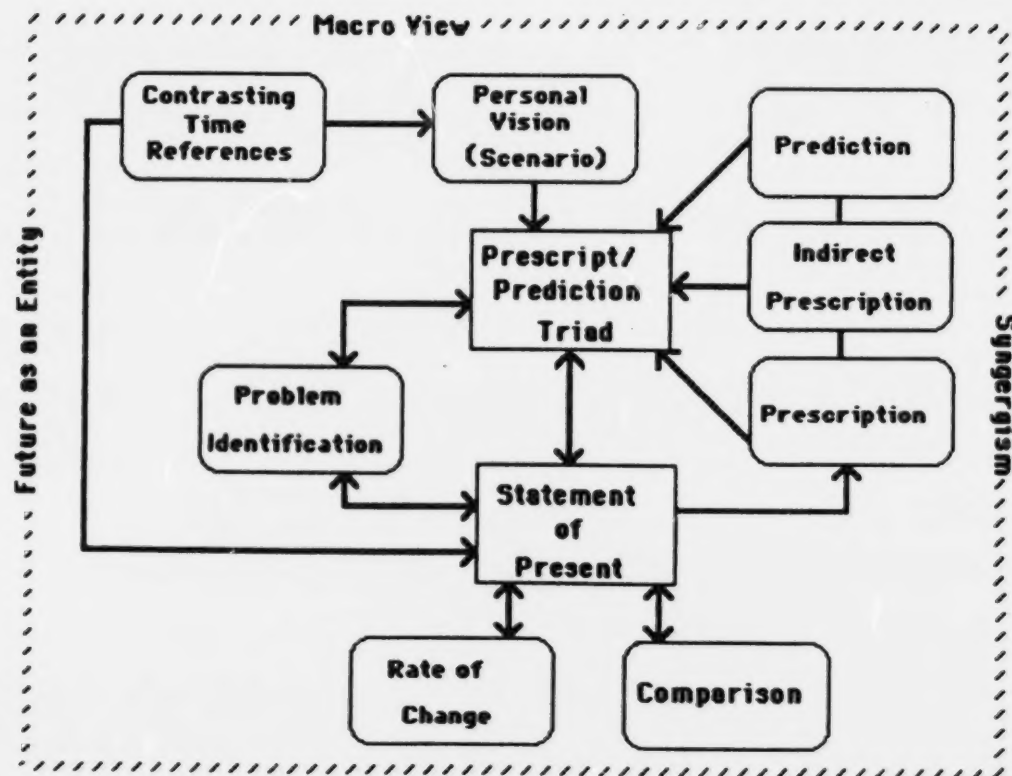


Figure A.

Three predominant themes emerge as characteristics of how people talk about the future. First, future talk relates past and present events in order to foster better understanding and acceptance for the changes to come. Second, cause and effect relationships provide a fuller context for imagining and understanding the possible futures we face in science and technology. Third, talk about the future tends to deal with competitive issues and comparisons.

Future thinking emphasizes coping with change and uncertainty, an activity that occurs in everyday life and work. The future is likely to be different from the past and the present because of the pace of change (Graham, 1982). This statement and the work of Wood and Christakis (1984) confirms the importance of relating projections of the future to past or present events. Categories such as *Prescription*, *Indirect Prescription*, *Prediction*, *Reference to the Present*, and *Contrasting Time References* emphasize the element of change that is inherent in the future.

This concept of relating the future to other time frames relates causality as well. Establishing causal links in the prescription/prediction triad is an important step in formulating scenarios. This process helps a person to understand the origins and the impact of a predicted condition or event which can yield greater acceptance of assertions in the argument. When a policy maker is asked to describe their preferred future, he provides a full context for understanding what is important to him about his world (Eden, 1979).

The third major theme is competition. As illustrated in the clustering exercise, competition and change are very closely related. The rate at which technological advancements are occurring creates an even more pressure for that illusive "competitive edge." The categories *References to the Present*, *Comparisons*, *Problem Identification*, and *Rate of Change* are particularly salient categories in considering the competitive characteristics of future talk.

"While an executive may be rational by virtue of training and predisposition, nonrational factors play an important role in his perception and management of corporate concerns."

(Lipinski, 1978) This factor supports the need for the communication strategies such as *Personal/Common Vision, Comparisons*, and emphasizing *Rate of Change* to motivate decision makers to take action to shape the future.

Conclusions and Future Directions

This study was not intended to be prescriptive or used to judge speaker effectiveness. What has emerged is a relatively parsimonious set of characteristics of the way people talk to state policy makers about the future in science and technology. It could be used as a starting place for a more rhetorically based study of speaker effectiveness--identifying appropriate strategies, i.e. combinations of characteristics, for different audiences, settings, and purposes.

Another area for future study might involve examining the differences in talk among people who have varying perspectives toward the future. Schumann and Zandan (1985) contend that people who have different attitudes toward the future, talk differently about it. Using a typology from Daniel Yankelovich, they classify people's view of the future into four categories: 1) discounters (those who have a fatalist attitude toward the future); 2) romantics (those who feel the future is a political struggle); 3) modelers (those who have an economic or formula-driven outlook); and 4) grand masters (those who use diverse information to think about the long term). This paper concentrated on the grand master category, but do grand masters talk differently from discounters? do romantics use different categories of future talk than modelers? This would require developing a profile for each of these future perspectives, and then cross matching the talk characteristics with the future perspective. For example, one could verify that a speaker was indeed a modeler or discounter, then use the model developed in this paper to identify the factors in their expressions about the future.

Last, a future study might look at talk in less formal settings. How does the context affect future talk? How does interaction affect it? This approach would require establishing criteria for formal/informal settings and interactive/noninteractive circumstances.

Assessing effectiveness, comparing speakers with different perspectives of the future, and altering the targeted contexts would add to the flexibility and generalizability of the body of knowledge pertaining to how people talk about the future.

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